Configuring Cisco Access Routers and the NME-WAE Network Module for ACNS Deployments

April 14, 2008

This document describes how to configure the Cisco access router and the Cisco Wide Area Application Engine network module (NME-WAE) for Application and Content Networking System (ACNS) software deployments.

The WAE network module is a standalone Wide Area Application Engine (WAE) that plugs into a host Cisco access router. The host router runs Cisco IOS software, while the WAE network module has its own startup and run-time configurations that are independent of the IOS configuration on the router.

ACNS software is a Linux-based application that resides on the WAE network module. ACNS software offers the following content-based services:

- Content caching and hosting
- Proxy services
- Content replication
- Video streaming

The host router and the network module combined provide a router-integrated application platform for accelerating data-intensive applications.

Contents

- Prerequisites for Installing the Cisco WAE Network Modules, page 2
- Restrictions for Cisco WAE Network Modules, page 2
- Cisco WAE Network Module Hardware Description, page 3
- Setting Up Cisco WAE Network Modules and Opening a Session, page 5
- Starting the Cisco WAE Network Module and Displaying Status, page 10
- Command Reference, page 15

Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

© 2007-2008 Cisco Systems, Inc. All rights reserved.

- Glossary, page 37
- Related Documentation, page 38
- Obtaining Documentation, Obtaining Support, and Security Guidelines, page 39

Prerequisites for Installing the Cisco WAE Network Modules

The prerequisites for installing the Cisco WAE network module in the access router are as follows:

- Plan software upgrades or downgrades for times when you can take all applications that run on the host router offline.
- Ensure that you have the appropriate Cisco access router to serve as the host router. The WAE network module is supported on the following Cisco access routers:
  - 2811, 2821, and 2851
  - 3725, 3825, and 3845
- Ensure that the router is running IOS Release 12.4(9)T or 12.4(9)T1 (recommended) by using the **show version** command.

  When minimum release requirements are met, you can change images on either the router or the network modules without affecting performance.
- For information about installing the NME-WAE, see the *Quick Start Guide: Network Modules for Cisco Access Routers* and *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information*.
- You need the slot and unit numbers for the "Setting Up Network Module Interfaces" section on page 6 and the "Opening and Closing a Network Module Session" section on page 8. Make a note of the network module location in the host router:
  - *slot*—Slot number of the network module in the router chassis. After you install the module, you can obtain this information from the router **show running-config** command output.
  - *unit*—Number of the daughter card on the module. This value is always 0.
- You need an accessible FTP or TFTP file server.
  - Use an FTP file server for installations, backups, and restores.
  - Use a TFTP file server (on the FTP-file-server machine) for boothelper operations to recover from a failed installation.

Restrictions for Cisco WAE Network Modules

The restrictions for the Cisco WAE network modules are as follows:

- You may perform a software upgrade or downgrade only on an inactive appliance. Plan upgrades or downgrades for times when you can take all applications that run on the host router out of service or offline.
- All WAE appliances and network modules that are in your network must be running the same version of the ACNS software.
- Network module software configurations can only be performed by using a console that connects to a single serial-port console port on the host router.

Because the network module does not have an external console port, you must configure the network module by initiating a Telnet session or by initiating a configuration session from the router CLI.

- After initial setup, which requires using router configuration commands, you can configure the NME-WAE in the same manner as other ACNS devices, with the following exceptions:
  - The NME-WAE cannot serve as a Content Distribution Manager for other ACNS devices.
  - The NME-WAE does not support device mode configuration. The device mode configuration prompt has been removed from the NME-WAE startup script.
  - Websense URL-filtering is not supported on the NME-WAE.
- ACNS software does not support the following hardware-related features on the network module:
  - USB port
  - Compact Flash utilization LED
  - Software reset button

Cisco WAE Network Module Hardware Description

This section includes the following topics describing the WAE network module hardware:

- Hard Disk and Memory Specifications
- Faceplate and LEDs
- Hardware Interfaces

Hard Disk and Memory Specifications

The NME-WAE ships from the factory with the hardware listed in Table 1 preinstalled.

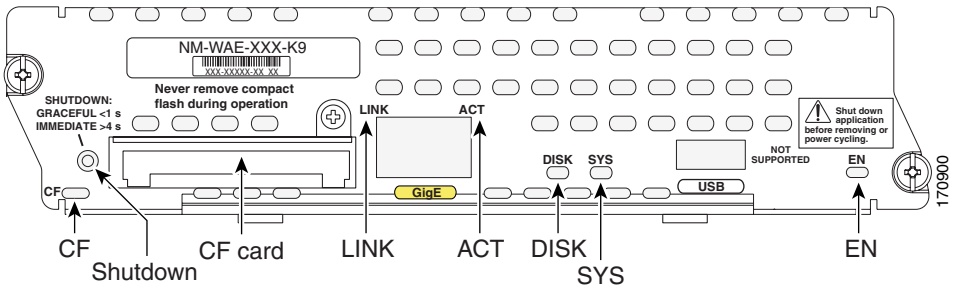
Table 1 Network Module Hardware

Model	Hard Disk	Memory
NME-WAE-502-K9	120 GB	1 GB
NME-WAE-522-K9	160 GB	2 GB

Faceplate and LEDs

Figure 1 shows the NME-WAE faceplate and LEDs.

Figure 1 NME-WAE Faceplate and LEDs

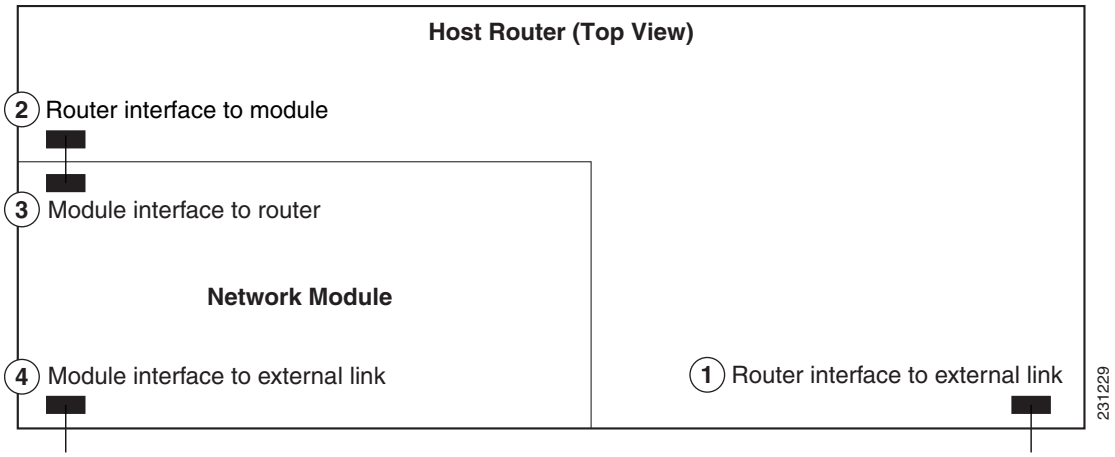


CF	Not used
Shutdown	Press the Shutdown button for greater than 4 seconds to cause an immediate module shutdown, which may impact file operations that are in progress.
CF card	CompactFlash memory card
LINK	Status of Gigabit Ethernet link On—Link is enabled Off—Link is disabled
ACT	Status of Gigabit Ethernet activity On—Active Off—Inactive
DISK	Status of hard drive activity On—Active Off—Inactive
SYS	Status of system shutdown On—System is shut down and ready for host power down Off—Application is stable Flashing—System shutdown is in progress
EN	Status of the network module On—Detected by the host IOS software and enabled Off—Disabled

Hardware Interfaces

The host router and network module use several interfaces for internal and external communication (see Figure 2). Each interface is configurable by using a IOS-like CLI.

Figure 2 Router and Network Module Interface



	On This Hardware Interface...	Configure These Settings...	Using This Configuration Interface
1	Router interface to external link (GigabitEthernet *slot*/0)	Standard router settings	Router IOS command-line interface
2	Router interface to module (Integrated-Service-Engine *slot*/0)	Module IP address and default gateway router	
3	Module interface to router (Integrated-Service-Engine *slot*/0)	All other module and ACNS application settings	NME-WAE network module command-line interface
4	Module interface to external link (Integrated-Service-Engine *slot*/0)	All other module and ACNS application settings	

The NME-WAE accepts traffic to be optimized on either its internal or external interface but not on both interfaces. Configure either the module internal interface to the router (see callout 3 in Figure 2) or the module external interface (see callout 4 in Figure 2) but not both interfaces.

When using the ACNS Content Distribution Manager GUI for an NME-WAE device, the internal interface to the router is designated as slot 1, port 0 and the external network interface is designated as slot 2, port 0, regardless of the physical slot in which the NME-WAE is installed.

Setting Up Cisco WAE Network Modules and Opening a Session

This section contains the following topics:

- Setting Up Network Module Interfaces, page 6
- Opening and Closing a Network Module Session, page 8

If you lose power or connection during any of the following procedures, the software usually detects the interruption and tries to recover. If it fails to recover, reinstall the software using the boothelper.

You can configure basic network parameters for the network module by using the CLI, which is described in this document. For additional configuration instructions, see the ACNS online help that is included with the software application.

Setting Up Network Module Interfaces

Your first configuration task is to configure the network module interfaces to the host router and to its external links. You use these interfaces to access the module for installing and configuring the ACNS software application.

This section includes the following topics:

- Summary Steps
- Detailed Steps
- Examples

The first several steps open the host router CLI to the module. The subsequent steps configure the interface.

Summary Steps

The network module is referred to as the *integrated service engine* (ISE) on the IOS CLI.

From the host router CLI, use the following commands:

1. **enable**
2. **configure terminal**
3. **interface integrated-service-engine** *slot*/**0**
4. **ip address** *router-side-ip-address subnet-mask*
5. **service-module ip address** *module-side-ip-address subnet-mask*

   or

   service-module external ip address *module-side-ip-address subnet-mask*
6. **service-module ip default-gateway** *gateway-ip-address*
7. **end**
8. **copy running-config startup-config**
9. **show running-config**

Detailed Steps

From the host router CLI, perform the following steps:

	Procedure	Command
Step 1	Enter privileged EXEC mode on the host router. Enter your password if prompted.	**enable** **Example:** `Router> enable`
Step 2	Enter global configuration mode on the host router.	**configure terminal** **Example:** `Router# configure terminal`
Step 3	Enter interface configuration mode for the slot where the network module resides.	**interface integrated-service-engine** *slot*/**0** **Example:** `Router(config)# interface integrated-service-engine 1/0`
Step 4	Specify the router interface to the module (see callout 2 in Figure 2). Arguments are as follows: • *router-side-ip-address subnet-mask*—IP address and subnet mask for the interface.	**ip address** *router-side-ip-address subnet-mask* **Example:** `Router(config-if)# ip address 10.0.0.20 255.255.255.0`

Step 5	Specify the IP address for the module interface to the router (see callout 3 in Figure 2). To configure the external interface (see callout 4 in Figure 2) instead of the internal interface, use the second form of the command. Arguments are as follows:
	• *module-side-ip-address*—IP address for the interface.
	• *subnet-mask*—Subnet mask to append to the IP address; must be in the same subnet as the host router subnet specified in Step 4.
		service-module ip address *module-side-ip-address subnet-mask*
		
		or
		
		service-module external ip address *module-side-ip-address subnet-mask*
		
		Example:
		`Router(config-if)# service-module ip address 10.0.0.30 255.255.255.0`
		
		or
		
		`Router(config-if)# service-module external ip address 10.0.0.30 255.255.255.0`

Step 6	Specify the IP address for the default gateway router for the module. The argument is as follows: • *gateway-ip-address*—IP address for the gateway router.	**service-module ip default-gateway** *gateway-ip-address* **Example:** `Router(config-if)# service-module ip default-gateway 10.0.0.20`
Step 7	Return to global configuration mode on the host router.	**end** **Example:** `Router(config-if)# end`

	Procedure	Command
Step 8	Save the router running configuration.	**copy running-config startup-config** **Example:** `Router# copy running-config startup-config`
Step 9	Display the router running configuration so that you can verify interface configurations.	**show running-config** **Example:** `Router# show running-config`

Examples

The following partial output from the **show running-config** command shows how the interfaces are configured:

```
interface service-engine1/0
 ip address 10.0.0.20 255.255.255.0
 service-module integrated-service-engine ip address 10.0.0.30 255.255.255.0
 service-module integrated-service-engine ip default-gateway 10.0.0.20
```

Opening and Closing a Network Module Session

Once you have set up your network interfaces, you can open and close a session on the network module. Opening a session is the equivalent of accessing an ACNS appliance from its console. You can conduct only one session at a time.

The procedure listed below uses the **service-module integrated-service-engine** *slot***/0 session** command to open a session. Alternatively, you can access the network module console by telneting to a specific port at the network module IP address, depending on the slot where the network module is installed, as follows:

- slot 1—telnet to port 2066
- slot 2—telnet to port 2130
- slot 3—telnet to port 2194
- slot 4—telnet to port 2258

This section includes the following topics:

- Summary Steps
- Detailed Steps
- Where to go Next

Summary Steps

To open a network module session, use the following commands from the host router CLI:

1. **enable**
2. **service-module integrated-service-engine** *slot***/0 status**
3. **service-module integrated-service-engine** *slot***/0 session**

Use the following commands from the **Network Module Interface**

4. Log in to the network module.
5. Perform configuration or other procedures by using the ACNS CLI.
6. **Press Control-Shift-6 x.**

Use the following command from the host router CLI:

7. **service-module integrated-service-engine** *slot*/**0 session clear**

Detailed Steps

To open a network module session, perform the following steps:

	Procedure	Command
Step 1	From the host router CLI, enter privileged EXEC mode on the host router. Enter your password if prompted.	**enable** **Example:** `Router> enable`
Step 2	Display the status of the specified module so that you can ensure that the module is running (that is, in the steady state). For details, see the service-module integrated-service-engine status command. If the module is not running, start it with one of the startup commands listed in the "Shutting Down and Starting Up Cisco WAE Network Modules" section on page 11.	**service-module integrated-service-engine** *slot*/**0 status** **Example:** `Router# service-module integrated-service-engine 2/0 status`

Step 3	Begin a service module session on the specified module. Perform one of the following actions:
	• To interrupt the auto-boot sequence and access the bootloader, quickly type ***.
	• To start a configuration session, press **Enter**.
	
	To use telnet to access the network module, use the second form of the command.
		service-module integrated-service-engine *slot*/**0 session**
		
		or
		
		telnet *module-ip-address port*
		
		Example:
		`Router# service-module integrated-service-engine 1/0 session`
		
		`Trying 10.10.10.1, 2066 ... Open`
		
		or
		
		`Router# telnet 10.10.10.1 2066`

Step 4	From the network module interface, log in to the network module. The default username is **admin** and the default password is **default**.	`Cisco Content Engine Console`
		
		`Username: admin`
		`Password:`
		
		`System Initialization Finished.`
		
		`SE-Module#`

	Procedure	Command

Step 5	Enter configuration commands on the module as needed.
	
	Configuration command choices are similar to those commands that are available on the router. Access global configuration mode by using the **configure terminal** command. Enter configuration commands. Then exit global configuration mode with the **exit** command and save your new configuration with the **write** command.
		Example (Configuration):
		
		`SE-Module# configure terminal`
		`SE-Module(config)#`
		`.`
		`.`
		`.`
		`SE-Module(config)# exit`
		`SE-Module# write`

Step 6	Close the service module session and return to the router CLI. The service module session remains active until you clear it in the next step. While it remains active, you can return to it from the router CLI by pressing **Enter**.	Press **Ctrl-Shift-6 x**.
Step 7	From the host router CLI, clear the service module session for the specified module. When prompted to confirm this command, press **Enter**.	**service-module integrated-service-engine** *slot*/**0 session clear** **Example:** `Router# service-module integrated-service-engine 1/0 session clear`

Where to go Next

See the "Starting the Cisco WAE Network Module and Displaying Status" section on page 10 for information about maintaining and administering the WAE network module.

See the "Command Reference" section on page 15 for a list of new and modified IOS commands used to configure the WAE network module.

Starting the Cisco WAE Network Module and Displaying Status

This section contains the following topics:

- Accessing the ACNS Software on the Network Module
- Shutting Down and Starting Up Cisco WAE Network Modules, page 11
- Displaying Status and Diagnostic Output, page 12

The tables in these sections list only the most common router and network module commands. The tables group commands by the configuration mode in which they are available. If the same command is available in more than one mode, it may act differently in each mode.

To view a complete list of available commands, type **?** at the prompt, as shown in the following example:

```
Router(config-if)# ?
```

To view a complete list of command keyword options, type **?** at the end of the command, as shown in the following example:

```
Router# service-module integrated-service-engine ?
```

Accessing the ACNS Software on the Network Module

You can access the ACNS software that runs on the network module by first accessing one of the following:

- The router IOS command-line interface (CLI) to open a console session to the network module
- The ACNS Content Distribution Manager graphical user interface (GUI)

For details about configuring and maintaining your ACNS network, see the following documents:

- *Cisco Application and Content Networking System Software Configuration Guide for Centrally Managed Deployments*
- *Cisco Application and Content Networking System Software Configuration Guide for Locally Managed Deployments*
- *Cisco Application and Content Networking System Software Command Reference*

When using the ACNS Content Distribution Manager GUI for an NME-WAE device, the internal interface to the router is designated as slot 1, port 0 and the external network interface is designated as slot 2, port 0, regardless of the physical slot in which the NME-WAE is installed.

Shutting Down and Starting Up Cisco WAE Network Modules

To shut down or start up the network module or the ACNS software that runs on the module, use a command from the common router and network module commands listed in Table 2.

Be aware of the following command functions:

- Shutdown commands can potentially disrupt service. The command output will display a confirmation prompt before shutdown occurs. Confirm by pressing **Enter** or cancel by typing **n** and pressing **Enter**. To prevent the prompt from displaying, use the **no-confirm** keyword.
- Some commands shut the module or application down and then immediately restart it.

Table 2 Common Shutdown and Startup Commands

Configuration Mode	Command	Purpose
`Router#`	**service-module integrated-service-engine** *slot*/**0 reload**	Shuts down the network module operating system gracefully and then restarts it from the bootloader.
`Router#`	**service-module integrated-service-engine** *slot*/**0 reset**	Resets the hardware on a module. Use this command only to recover from shutdown or a failed state. **Caution** Using this command does *not* provide an orderly software shutdown and may impact file operations that are in progress.
`Router#`	**service-module integrated-service-engine** *slot*/**0 session**	Accesses the specified service engine and begins a network module configuration session.

Table 2 Common Shutdown and Startup Commands (continued)

Configuration Mode	Command	Purpose
`Router#`	**service-module integrated-service-engine** *slot*/**0 shutdown**	Shuts down the network module operating system gracefully. Use when removing or replacing a hot-swappable module during online insertion and removal (OIR).
`Router#`	**service-module integrated-service-engine** *slot*/**0 status**	Displays configuration and status information for the network module hardware and software.
`Router#`	**shutdown**	Shuts down the entire system (both the host router and the service module) gracefully.
`SE-Module#`	**reload**	Shuts down ACNS gracefully, and then reboots it from the bootloader.
`SE-Module#`	**shutdown**	Shuts down the ACNS application gracefully, and then shuts down the module.

Displaying Status and Diagnostic Output

To verify the status of an installation, upgrade, or downgrade, or to troubleshoot problems, use the commands as needed from the common router and network module commands listed in Table 3.

Many **show** commands provide keyword options to display diagnostic output on your screen or to send the output to a file or a URL.

Table 3 Common Verification and Troubleshooting Commands

Configuration Mode	Command	Purpose
`Router#`	**ping**	Pings a specified IP address to check network connectivity (does not accept a hostname as destination).
`Router#`	**show arp**	Displays the current Address Resolution Protocol (ARP) table.
`Router#`	**show clock**	Displays the current date and time.
`Router#`	**show configuration**	Displays the current bootloader configuration as entered by means of the **configure** command.
`Router#`	**show controllers integrated-service-engine**	Displays interface debug information.
`Router#`	**show diag**	Displays standard IOS diagnostic information including information about the ACNS software.
`Router#`	**show hardware**	Displays information about network module and host router hardware.
`Router#`	**show hosts**	Displays the default domain name, style of name lookup, list of name-server hosts, and cached list of hostnames and addresses.

Table 3 Common Verification and Troubleshooting Commands (continued)

Configuration Mode	Command	Purpose
Router#	**show interfaces**	Displays information about hardware interfaces, including the network and the disk.
Router#	**show interfaces integrated-service-engine**	Displays information about the module side of the router-module interface.
Router#	**show ntp status**	Displays information about the Network Time Protocol (NTP).
Router#	**show processes**	Displays a list of the application processes that are running.
Router#	**show running-config**	Displays the configuration commands that are in effect.
Router#	**show startup-config**	Displays the startup configuration.
Router#	**show tech-support**	Displays general information about the host router. This information is useful to Cisco technical support for problem diagnosis.
Router#	**show version**	Displays information about the loaded router software or network module bootloader version as well as hardware and device information.
Router#	**test scp ping**	Pings the service module to check network connectivity.
Router#	**verify**	Displays version information for installed hardware and software.
SE-Module#	**ping**	Pings a specified IP address to check network connectivity (does not accept a hostname as destination).
SE-Module#	**show arp**	Displays the current Address Resolution Protocol (ARP) table.
SE-Module#	**show clock**	Displays the current date and time.
SE-Module#	**show config**	Displays the startup configuration stored on the CompactFlash drive.
SE-Module#	**show hosts**	Displays the default IP domain name, lookup style, name servers, and host table.
SE-Module#	**show interfaces** *interfacename*	Displays information about the network module interfaces.
SE-Module#	**show ntp status**	Displays information about the Network Time Protocol (NTP).
SE-Module#	**show processes**	Displays a list of the application processes that are running.
SE-Module#	**show running-config**	Displays the configuration commands that are in effect.
SE-Module#	**show startup-config**	Displays the startup configuration.

Table 3 Common Verification and Troubleshooting Commands (continued)

Configuration Mode	Command	Purpose
SE-Module#	**show tech-support**	Displays general information about the service module. This information is useful to Cisco technical support for problem diagnosis.
SE-Module#	**show version**	Displays information about the loaded router software or network module bootloader version and also hardware and device information.

Command Reference

This section documents the module-specific IOS router commands that are used to configure the WAE network module from the router command-line interface (CLI). All other IOS software commands used with this feature are documented in the IOS Release 12.4(9) T command reference publication.

The network module is also known as the *integrated-service-engine* within the IOS CLI.

- interface integrated-service-engine, page 16
- service-module integrated-service-engine default-boot, page 17
- service-module integrated-service-engine reload, page 18
- service-module integrated-service-engine reset, page 19
- service-module integrated-service-engine session, page 21
- service-module integrated-service-engine shutdown, page 23
- service-module integrated-service-engine statistics, page 25
- service-module integrated-service-engine status, page 26
- show controllers integrated-service-engine, page 28
- show interfaces integrated-service-engine, page 33
- show diag, page 30—Modified command

interface integrated-service-engine

To enter the interface configuration mode for an integrated-service-engine (ISE) network module, use the **interface integrated-service-engine** command in global configuration mode.

interface integrated-service-engine *slot/unit*

Syntax Description

slot	Slot number of the interface.
unit	Number of the daughter card on the network module. For ISE network modules, always use 0.

Defaults

None

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

This command is used only for ISE network modules. If your router does not have this hardware, then you will not be able to enter this command.

A **no** form of this command (**no interface integrated-service-engine**) is not available. Use the **exit** command to exit the interface configuration mode.

Examples

The following example shows how to enter configuration mode for ISE network modules located in slot 1, unit 0:

```
Router (config)# interface integrated-service-engine 1/0
Router (config-if)# exit
```

service-module integrated-service-engine default-boot

To configure the integrated-service-engine (ISE) network module to use the default BIOS and bootloader, use the **service-module integrated-service-engine default-boot** command in privileged EXEC mode.

service-module integrated-service-engine slot/unit default-boot

Syntax Description

slot	Slot number of the network module in the router chassis.
unit	Number of the daughter card on the network module. For ISE network modules, always use 0.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for the ISE network module.

Examples

After a downtime event or failed upgrade, use the **service-module integrated-service-engine** *slot/unit* **default-boot** command to configure the network module to use the primary BIOS and primary bootloader to perform startup routines.

The following is sample output from the **integrated-service-engine** *slot/unit* **default-boot** command for a port adapter in chassis slot 2 on a Cisco router:

```
Router# service-module integrated-service-engine 2/0 default-boot
clear  Clear Default Boot
set    Set Default Boot

Router# service-module integrated-service-engine 2/0 default-boot clear
Router# service-module integrated-service-engine 2/0 default-boot set
```

service-module integrated-service-engine reload

To perform a graceful shutdown and reboot of the integrated-service-engine (ISE) network module ACNS operating system, use the **service-module integrated-service-engine reload** command in privileged EXEC mode.

service-module integrated-service-engine *slot*/*unit* **reload**

Syntax Description

slot	Slot number of the network module in the router chassis.
/unit	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.

Examples

The following example gracefully shuts down and reboots the ISE network module ACNS operating system in slot 1:

```
Router# service-module integrated-service-engine 1/0 reload

Do you want to proceed with reload?[confirm]
```

Related Commands

Command	Description
interface integrated-service-engine	Configures an interface for ISE network modules and enters interface configuration mode.
service-module integrated-service-engine reset	Resets the hardware on ISE network modules.
service-module integrated-service-engine shutdown	Gracefully shuts down ISE network modules.
show diag	Displays controller information for ISE network modules.
show interfaces integrated-service-engine	Displays basic interface configuration information for ISE network modules.

service-module integrated-service-engine reset

To reset the integrated-service-engine (ISE) network module hardware, use the **service-module integrated-service-engine reset** command in privileged EXEC mode.

service-module integrated-service-engine *slot*/*unit* **reset**

Syntax Description

slot	Slot number of the network module in the router chassis.
/*unit*	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.

Caution Because you may lose data, use the **service-module integrated-service-engine reset** command only to recover from a shutdown or failed state.

Examples

The following example resets the hardware on the ISE network module in slot 1:

```
Router# service-module integrated-service-engine 1/0 reset

Use reset only to recover from shutdown or failed state
Warning: May lose data on the hard disk!
Do you want to reset?[confirm]
```

Related Commands

Command	Description
interface integrated-service-engine	Configures an interface for ISE network modules and enters interface configuration mode.
service-module integrated-service-engine reload	Performs a graceful shutdown and reboot on the ISE network module ACNS operating system.
service-module integrated-service-engine shutdown	Gracefully shuts down ISE network modules.

Command	Description
show diag	Displays controller information for ISE network modules.
show interfaces integrated-service-engine	Displays basic interface configuration information for ISE network modules.

service-module integrated-service-engine session

To begin a configuration session with an integrated-service-engine (ISE) network module through a console connection, use the **service-module integrated-service-engine session** command in privileged EXEC mode.

service-module integrated-service-engine *slot*/*unit* **session** [**clear**]

Syntax Description

slot	Slot number of the network module in the router chassis.
/*unit*	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.
clear	(Optional) Clears the ISE configuration session.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

Only one session at a time is allowed into the network module from the internal ISE network-module-side interface.

After starting a session, access the ISE console in a user-level shell. To access the privileged EXEC command shell, where most commands are available, use the **enable** command.

After you finish the ISE configuration and exit the ISE console session, use this command with the **clear** keyword to clear the session. At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.

Examples

The following example shows an ISE session being opened for an ISE network module in slot 2:

```
Router# service-module integrated-service-engine 2/0 session

Trying 10.10.10.1, 2066 ... Open

Cisco Content Engine Console

Username:
```

The following example clears the session that had been used to configure the ISE in the network module in slot 2:

```
Router# service-module integrated-service-engine 2/0 session clear
[confirm]
 [OK]
```

Related Commands

Command	Description
enable	Enters privileged EXEC mode.
interface	Configures an interface and enters interface configuration mode.
show diag	Displays controller information for a network module.
show interface integrated-service engine	Displays basic interface configuration information for network modules.

service-module integrated-service-engine shutdown

To gracefully shut down an integrated-service-engine (ISE) network module, use the **service-module integrated-service-engine shutdown** command in privileged EXEC mode.

service-module integrated-service-engine *slot*/*unit* **shutdown**

Syntax Description

slot	Slot number of the network module in the router chassis.
/*unit*	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.

The **service-module integrated-service-engine shutdown** command shuts down the operating system of the specified integrated-service-engine network module in an orderly fashion to protect the hard drive. When the operating system has been shut down, the module can be removed from the router, if necessary.

Examples

The following example gracefully shuts down the ISE network module in slot 1:

```
Router# service-module integrated-service-engine 1/0 shutdown

Shutdown is used for Online removal of Service Module.
Do you want to proceed with shutdown?[confirm]
Use service module reset command to recover from shutdown.
```

Related Commands

Command	Description
interface integrated-service-engine	Configures an interface for ISE network modules and enters interface configuration mode.
service-module integrated-service-engine reload	Performs a graceful shutdown and reboot of an ISE network module ACNS operating system.
service-module integrated-service-engine reset	Resets the hardware on ISE network modules.

Command	Description
show diag	Displays controller information for ISE network modules.
show interfaces integrated-service-engine	Displays basic interface configuration information for ISE network modules.

service-module integrated-service-engine statistics

To display reset and reload information for an integrated-service-engine (ISE) network module and its IOS software, use the **service-module integrated-service-engine statistics** command in EXEC mode.

service-module integrated-service-engine *slot*/*unit* **statistics**

Syntax Description

slot	Slot number of the network module in the router chassis.
/*unit*	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Defaults

none

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

The statistics displayed by this command represent control communication events between the network module and the router. For ACNS-specific statistics, access the ACNS CLI and use the **show statistics** commands documented in the *Cisco Application and Content Networking System Software Command Reference*.

Examples

The following example displays information for an ISE network module that is installed in slot 2 of an access router:

```
Router# service-module integrated-service-engine 2/0 statistics

Module Reset Statistics:
  CLI reset count = 1
  CLI reload count = 0
  Registration request timeout reset count = 0
  Error recovery timeout reset count = 0
  Module registration count = 2

The last IOS initiated event was a cli reset at *13:34:33.847 UTC Sun Dec 18 2005
```

service-module integrated-service-engine status

To display configuration information related to software on the integrated-service-engine (ISE) side of a network module, use the **service-module integrated-service-engine status** command in privileged EXEC mode.

service-module integrated-service-engine *slot*/*unit* **status**

Syntax Description

slot	Slot number of the network module in the router chassis.
/unit	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

Use the **service-module integrated-service-engine status** command to perform the following tasks:

- Display the ISE network module software release version
- Check the ISE network module status (steady or down)

Examples

The following example displays information for an ISE network module that is installed in slot 1 of an access router:

```
Router# service-module integrated-service-engine 1/0 status

Service Module is Cisco Integrated-Service-Engine1/0
Service Module supports session via TTY line 66
Service Module is in Steady state
Getting status from the Service Module, please wait..
Cisco Application and Content Networking System Software 5.5.7 (b17 Apr 27 2007 08:56:37)
Restarted at Sun Apr 1 15:32:38 2007
```

The following example displays information for an ISE network module that is not running:

```
Router# service-module integrated-service-engine 1/0 status

Service Module is Cisco Integrated-Service-Engine1/0
Service Module supports session via TTY line 258
Service Module is trying to recover from reset/shutdown
Service Module status is not available
```

Related Commands

Command	Description
interface integrated-service-engine	Configures an interface for ISE network modules and enters interface configuration mode.
show diag	Displays controller information for ISE network modules.
show interfaces integrated-service-engine	Displays basic interface configuration information for ISE network modules.

show controllers integrated-service-engine

To display controller information for integrated-service-engine (ISE) network modules, use the **show controllers integrated-service-engine** command in privileged EXEC mode.

show controllers integrated-service-engine *slot/unit*

Syntax Description

slot	Slot number of the network module in the router chassis.
/unit	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Examples

Table 4 describes the fields shown in the command output.

Table 4 show controllers integrated-service-engine Field Descriptions

Field	Description
Hardware	Description of the chip being used.
IDB, FASTSEND	Address in router memory of the interface descriptor block (IDB) and the fastsend routine.
INSTANCE	Device-specific data stored in router memory that lists the memory locations and current indexes of receive (Rx) and transmit (Tx) rings in the router I/O memory.
CONTROL AND STATUS REGISTERS (CSR)	Control and status registers that are physically located on the chip itself and that are accessed by the CPU over the protocol control information (PCI) bus.
PHY REGISTERS	Contents of the physical layer (PHY) registers. A PHY module is a device that interfaces to the physical Ethernet line and that is located between the chip and the physical line.
HARDWARE STATISTICS	Receive (Rx) and transmit (Tx) traffic statistics collected by the chip.
INTERRUPT STATISTICS	Transmit (Tx), Receive (Rx), control, software, and flow control interrupt statistics collected by the chip.

Related Commands

Command	Description
service-module external ipv6 address	Configures an interface for ISE network modules and enters interface configuration mode.
show interfaces integrated-service-engine	Displays basic interface configuration information for ISE network modules.

show diag

To display hardware and diagnostic information for a networking device, a line card, a processor, a jacket card, a chassis, or a network module, use the **show diag** command in privileged EXEC configuration mode.

show diag [*slot*]

Syntax Description

slot	(Optional) Slot number of the interface. If a slot number is not specified, diagnostic information for all slots is displayed.

Defaults

None

Privileged EXEC

Command History

Release	Modification
11.1CA	This command was introduced.
11.2	This command was integrated into IOS Release 11.2.
11.2P	This command output was modified for the PA-12E/2FE port adapter, PA-E3 port adapter, and PA-T3 port adapter.
11.2GS	This command was implemented on the 12000 series Gigabit Switch Routers (GSRs).
11.3 XA	This command was integrated in IOS Release 11.3 XA.
12.0	This command was implemented on the AS5300.
12.0(5)XQ	This command was implemented on the 1750 router.
12.0(7)T	This command was integrated into IOS Release 12.0(7)T.
12.1(9)EX	This command was introduced on the 7300 series routers, and the *slot* argument and **chassis** keyword were added.
12.1(10)EX	This command was enhanced to display information about Field-Programmable Gate Array (FPGA) image versions on installed NSEs and line cards on 7304 routers.
12.2(11)YZ	Support was added for the 7300-CC-PA.
12.2(8)T	This command was implemented for AIC and WIC cards on the 2600 series routers and the 3600 series routers.
12.2(13)T	This command was implemented for the AIM-VPN/EPII and AIM-VPN/HPII cards on the 2691, 3660, 3725, and 3745 routers.
12.2(15)ZJ	2611XM, 2620XM, 2621XM, 2650XM, and 2651XM routers.
12.2(18)S	This command was integrated into IOS Release 12.2(18)S and implemented on the 7304 router.
12.3(4)T	Support for the AIM-VPN/BPII card on the 2600XM series was integrated into IOS Release 12.3(4)T.
12.2(20)S2	This command was integrated into IOS Release 12.2(20)S2 and the **subslot** *slot*/*subslot* keyword and arguments were added to support SPAs on the 7304 router.

Release	Modification
12.0(31)S	This command was integrated into IOS Release 12.0(31)S and the **subslot** *slot/subslot* keyword and arguments were added to support SIPs and SPAs on the 12000 series router.
12.4(4)T	This command was implemented for the HWIC-1ADSL and HWIC-1ADSLI interface cards on the following platforms: 1800 (modular) series, 2800 series, and 3800 series routers.
12.4(9)T	This command was implemented for the NME-WAE-xxx-K9 and NME-AON-K9= network modules on the following platforms: 2811, 2821, 2851, 3725, and 3745 routers.
12.2(33)SRA	This command was integrated into IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to determine the type of hardware installed in your router, and to show detailed hardware information and EEPROM version information.

This command displays information for the motherboard, WAN interface cards (WICs), voice interface cards (VICs), high-speed WICs (HWICs), ATM interface cards (AICs), advanced integration modules (AIMs), port adapters, shared port adapters (SPAs), modular services cards (MSCs), SPA interface processors (SIPs), and network modules (NME).

Examples

Table 5 describes the fields shown in the command output.

Table 5 show diag subslot Field Descriptions

Field	Description
Hardware Revision	Revision number (signifying a minor revision) of the NME hardware.
Top Assy. Part Number	Part number of the NME.
Product Identifier (PID)	Product number of the NME.
Board Revision	Revision number of the circuit board in the module.
Deviation Number	Deviation number of the module.
Fab Version	Fabrication version of the module.
PCB Serial Number	Serial number of the printed circuit board.
Top Assy. Revision	Revision number (signifying a minor revision) of the NME.
RMA Test History	History of RMA testing.
RMA Number	RMA number of the module.
RMA History	History of RMA on this module.
Version Identifier	Not applicable to this module.
CLEI Code	Not applicable on this module. Common Language Equipment Identification number.
Product (FRU) Number	Product identification number.
EEPROM Format Version	Version of EEPROM format.
EEPROM Contents	Contents of EEPROM output.

Related Commands

Command	Description
show controllers integrated-service-engine	Displays controller information for integrated-service-engine network modules.
show interfaces integrated-service-engine	Displays basic interface configuration information for integrated-service-engine network modules.

show interfaces integrated-service-engine

To display basic interface configuration information for an integrated-service-engine (ISE) network module, use the **show interfaces integrated-service-engine** command in privileged EXEC mode.

show interfaces integrated-service-engine *slot/unit*

Syntax Description

slot	Slot number of the network module in the router chassis.
/unit	Number of the daughter card on the network module. For ISE network modules, always use 0. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced for ISE network modules.

Usage Guidelines

Table 6 describes the fields shown in the command output.

Table 6 show interfaces integrated-service-engine Field Descriptions

Field	Description
Integrated-Service-Engine	Indicates whether the ISE interface hardware is currently active. If the ISE interface hardware is active, the output states that "Integrated-Service-Engine slot/port is up." If it has been taken down by an administrator, the output states that "Integrated-Service-Engine slot/port is administratively down."
line protocol	Indicates whether the software processes that handle the line protocol consider the line usable or whether the line has been taken down by an administrator.
Hardware address	Hardware type and address.
Internet address	IP address.
MTU	Maximum transmission unit (MTU) of the integrated-service-engine interface.
BW	Bandwidth of the interface, in kilobits per second.
DLY	Delay of the interface, in microseconds.
reliability	Reliability of the interface as a fraction of 255 (255/255 is 100-percent reliability), calculated as an exponential average over 5 minutes.
txload	Transmit load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes.

Table 6 show interfaces integrated-service-engine Field Descriptions (continued)

Field	Description
rxload	Receive load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes.
Encapsulation	Encapsulation method that is assigned to the interface, ARPA in this case.
loopback	Indicates whether loopback is set.
Keepalive	Indicates whether keepalives are set and the interval between keepalives if they have been set.
Full-duplex	Indicates either full-duplex or half-duplex mode and other link configuration details.
ARP type Timeout	Type of Address Resolution Protocol (ARP) assigned and length of timeout.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by the interface and processed locally on the router. This field is useful for detecting when an interface failed. This field is not updated by fast-switched traffic.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by the interface. This field is useful for detecting when an interface failed.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because a transmission took too long. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
Last clearing	Elapsed time since the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Variables that may affect routing (for example, load and reliability) are not cleared when the counters are cleared. Asterisks (***) indicate that the elapsed time is too large to be displayed.
Input queue	Number of packets in the input queue. A slash separates the following values that indicate the maximum size of the queue, the number of packets dropped because of a full queue, and the number of times that queued packets have been discarded.
Total output drops	Number of packets in the output queue that have been dropped because of a full queue.
Queueing strategy	Queuing strategy applied to the interface, which is configurable under the interface. The default is FIFO.
Output queue	Number of packets in the output queue. A slash separates the following values that indicate the maximum size of the queue and the number of packets dropped because of a full queue.

Table 6 show interfaces integrated-service-engine Field Descriptions (continued)

Field	Description
5 minute input rate, 5 minute output rate	Average number of bits and packets transmitted per second in the last 5 minutes. If the interface is not in promiscuous mode, it senses network traffic that it sends and receives (rather than all network traffic). The 5-minute input and output rates should be used only as an approximation of traffic per second during a given 5-minute period. These rates are exponentially weighted averages with a time constant of 5 minutes. A period of four time constants must pass before the average will be within 2 percent of the instantaneous rate of a uniform stream of traffic over that period. **Note** The 5-minute period referenced in this output is a load interval that is configurable under the interface. The default value is 5 minutes.
packets input	Total number of error-free packets received by the system.
bytes	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space. Ignored Broadcast storms on Ethernet and bursts of noise on serial lines are often responsible for no input buffer events.
Received broadcasts	Number of broadcasts received.
runts	Number of packets that are discarded because they are smaller than the minimum packet size of the medium. For instance, any Ethernet packet that is less than 64 bytes is considered a runt.
giants	Number of packets that are discarded because they exceed the maximum packet size of the medium. For example, any Ethernet packet that is greater than 1518 bytes is considered a giant.
throttles	Number of times that the interface requested another interface within the router to slow down.
input errors	Errors that include runts, giants, no buffer, cyclic redundancy check (CRC), frame, overrun, and ignored counts. Other input-related errors can also cause the input errors count to be increased, and some datagrams may have more than one error; therefore, this sum may not balance with the sum of enumerated input error counts.
CRC	Errors created when the CRC generated by the originating LAN station or far-end device does not match the checksum calculated from the data received. On a LAN, such errors usually indicate noise or transmission problems on the LAN interface or the LAN bus. A high number of CRCs is usually the result of collisions or a station that is transmitting bad data.
frame	Number of packets received incorrectly that have a CRC error and a non-integer number of octets. On a LAN, this error is usually the result of collisions or a malfunctioning Ethernet device.

Table 6 show interfaces integrated-service-engine Field Descriptions (continued)

Field	Description
overrun	Number of times that the receiver hardware was unable to handle received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets that were ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different from system buffer space. Broadcast storms and bursts of noise can cause the ignored count to increase.
input packets with dribble condition detected	Number of packets with a dribble condition. Dribble bit error indicates that a frame is slightly too long. This frame error counter is incremented only for informational purposes; the router accepts the frame.
packets output	Total number of messages that have been transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulations, that have been transmitted by the system.
underruns	Number of times that the transmitter has run faster than the router could handle. This error may never be reported on some interfaces.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the integrated service engine that is being examined. This number may not balance with the sum of the enumerated output errors, because some datagrams may have more than one error, and others may have errors that do not fall into any of the specifically tabulated categories.
collisions	Number of messages that have been retransmitted because of an Ethernet collision. This error is usually the result of an overextended LAN (such as an Ethernet or transceiver cable that is too long, there are more than two repeaters between stations, or there are too many cascaded multiport transceivers). A packet that collides is counted only once in output packets.
interface resets	Number of times that an interface has been completely reset. This can occur if packets that were queued for transmission were not sent within several seconds. On a serial line, this error can be caused by a malfunctioning modem that is not supplying the transmit clock signal or caused by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down.
babbles	Count of frames that are greater than 1518 bytes and that have been transmitted. This error indicates that the transmitter has been on the interface longer than the time necessary to transmit the largest frame.
late collision	Number of late collisions. A collision becomes a late collision when it occurs after the preamble has been transmitted.

Table 6 show interfaces integrated-service-engine Field Descriptions (continued)

Field	Description
deferred	Indicates that the chip, while ready to transmit a frame, had to defer because the carrier was asserted.
lost carrier	Number of times that the carrier was lost during transmission.
no carrier	Number of times that the carrier was not present during the transmission.
output buffer failures, output buffers swapped out	Number of failed buffers and number of buffers swapped out.

Related Commands

Command	Description
interface integrated-service-engine	Configures an interface for an ISE and enters interface configuration mode.
show diag	Displays controller information for ISE network modules.

Glossary

ACNS Application and Content Networking System software.

ARP Address Resolution Protocol. Internet protocol used to map an IP address to a MAC address.

blade Alternate term for *service module*.

boothelper A small subset of the system software that runs on the module. It boots the module from the network and assists in software installation and upgrades, disaster recovery, and other operations when the module cannot access its software.

bootloader A small set of system software that runs when the system first powers up. It loads the operating system (from the disk, network, or compactFlash), which loads and runs the Cisco Application and Content Networking System application. The bootloader may optionally load and run the boothelper.

FTP File Transfer Protocol. Application protocol, part of the TCP/IP protocol stack, used for transferring files between network nodes.

ISE Integrated Service Engine. The network module is referred to as the *integrated service engine* (ISE) on the IOS CLI.

network module Standalone content engine with its own startup and run-time configurations that are independent of the IOS configuration on the router.

NME See network module,

NTP	Network Time Protocol. Protocol built on top of TCP that ensures accurate local timekeeping with reference to radio and atomic clocks located on the Internet. This protocol is capable of synchronizing distributed clocks within milliseconds over long time periods.
service (or services) engine	Alternate term for service module with installed application software.
syslog	Industry-standard protocol for capturing log information for devices on a network.
TCP	Transmission Control Protocol. Connection-oriented transport-layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack.
TFTP	Trivial File Transfer Protocol. Simplified version of FTP that allows files to be transferred from one computer to another over a network, usually without the use of client authentication (for example, username and password).
UDP	User Datagram Protocol. Connectionless transport-layer protocol in the TCP/IP protocol stack that exchanges datagrams without acknowledgments or guaranteed delivery, requiring that error processing and retransmission be handled by other protocols.
WAE	Wide Area Application Engine (hardware plus software) that accelerates content delivery, while ensuring the maximum scalability and availability of the content.

Related Documentation

For additional information on the ACNS software, IOS software, and the network module hardware, see the following documentation:

Related Topic	Document Title
Cisco Application and Content Networking System (ACNS) software	*Cisco Application and Content Networking System Software Configuration Guide for Centrally Managed Deployments* *Cisco Application and Content Networking System Software Configuration Guide for Locally Managed Deployments* *Cisco Application and Content Networking System Software Command Reference*
IOS software	*IOS Software*
Network Modules	*Cisco Network Modules Quick Start Guide* Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New* in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

CCVP, the Cisco logo, and Welcome to the Human Network are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, MeetingPlace, MGX, Networkers, Networking Academy, Network Registrar, PIX, ProConnect, ScriptShare, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0711R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

© 2007-2008 Cisco Systems, Inc. All rights reserved.